CORRECTED AMENDMENT TO THE CLAIMS:

1. (Currently Amended) A method of automated acquisition of a Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal, said method employing a state machine progressing from an initial state to a final state; said state machine comprising: a symbol timing recovery loop; a carrier loop; a coarse frequency loop; and an equalizer; said method comprising the steps of:

(A) Performing an automatic gain control (AGC) operation on said incoming Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal to maintain a steady amplitude of said QAM signal;

(B) Performing a symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal by adjusting a sampling clock of said symbol timing recovery loop;

(C) Performing a Blind Equalization of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal without carrier lock to minimize a dispersion error of ~~said~~ a received Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation as compared with an error-free QAM signal constellation by adjusting a set of coefficients of said equalizer;

(D) Performing a carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal to eliminate a residual carrier frequency error and to eliminate a phase error from said acquired Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal;

(D1) performing a frequency sweep to increase an acquisition bandwidth of a carrier recovery loop; wherein said frequency sweep is used if a frequency offset of said acquired Quadrature Amplitude Modulation (QAM) signal is greater than

said acquisition bandwidth of said carrier recovery loop;

and

(E) Performing a decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal by updating a set of coefficients of said equalizer by using a decision based algorithm.

2. (Currently Amended) The method of claim 1, wherein said step (A) of performing said automatic gain control (AGC) operation on said incoming Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(A1) causing said state machine to enter state "1A", wherein said state machine employs a minimum number of symbols to transition from said state 1A" to a next state.

3. (Currently Amended) The method of claim 2, wherein said step (A1) of performing said automatic gain control (AGC) operation while said state machine stays in said state "1A further includes the step of:

(A1, 1) computing, averaging and comparing to a target level an output power at Nyquist filter, wherein said output power represents the average power in said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation, and wherein an error signal between said average power in said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation and said output target power level is used to maintain a steady Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal amplitude.

4. (Currently Amended) The method of claim 1, wherein said step (A) of performing said automatic gain control (AGC) operation on said incoming Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(A2) causing said state machine to enter state "1B", wherein a process of coarse frequency estimation of said incoming Quadrature Amplitude Modulation (QAM) signal is performed in said state "1B".

5. (Currently Amended) The method of claim 4, wherein said step (A2) of performing said automatic gain control (AGC) operation while said state machine stays in said state "1B" further includes the step of:

(A2,1) performing a coarse frequency estimation of ~~said~~ a Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal frequency drift over a long period of time due to aging, temperature changes, humidity changes, ~~etc.,~~ in order to obtain a set of frequency corrections, and to apply said set of frequency corrections to a set of frequency offsets in said coarse frequency loop.

6. (Currently Amended) The method of claim 1, wherein said step (B) of performing said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further comprises the step of:

(B1) causing said state machine to enter state "2", wherein in said state "2" a symbol loop process adjusts a sampling clock or an interpolated sample to an ideal sample point.

7. (Currently Amended) The method of claim 6, wherein said step (B1) of

performing said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "2" further comprises the step of:

(B1,1) adjusting said sampling clock of said symbol timing recovery loop, and re-adjusting said sampling clock of said symbol timing recovery loop to optimize said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal.

8. (Currently Amended) The method of claim 1, wherein said step (B) of performing said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further comprises the step of:

(B2) causing said state machine to enter state "3", wherein in said state "3" said symbol timing recovery is continued, and wherein in said state "3" a symbol loop is readjusted for further refinement.

9. (Currently Amended) The method of claim 7, wherein said step (B2) of performing said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "3" further includes the step of:

(B2,1) re-adjusting ~~said~~ a set of frequency coefficients and re-adjusting ~~said~~ a set of phase coefficients of said symbol loop to optimize said symbol timing recovery.

10. (Currently Amended) The method of claim 1, wherein said step (C) of performing said Blind Equalization of said Quadrature Amplitude Modulation

(QAM) ~~QAM~~ signal without carrier lock further includes the step of:

(C1) causing said state machine to enter state "4", wherein in said state "4" said state machine performs the process of Blind Equalization by adapting equalizer coefficients without carrier lock so that a dispersion error is minimized.

11. (Currently Amended) The method of claim 10, wherein said step (C1) of performing said Blind Equalization of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal without carrier lock while said state machine stays in said state "4" further includes the step of:

(C1,1) substantially continuously performing a modulus update of said set of equalizer coefficients.

12. (Currently Amended) The method of claim 1, wherein said step (D) of performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(D1) causing said state machine to enter state "5A", wherein said state machine transitions from said state "5A" to a next state by employing a minimum number of symbols.

13. (Currently Amended) The method of claim 12, wherein said step (D1) of performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "5A" further includes the steps of:

(D1,1) adjusting ~~said~~ a set of frequency coefficients of said carrier loop; and

(D1,2) adjusting ~~said~~ a set of phase coefficients of said carrier loop.

14. (Currently Amended) The method of claim 1, wherein said step (D) of performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(D2) causing said state machine to enter state "5B", wherein said state "5B" corresponds to a "maximum number of Quadrature Amplitude Modulation (QAM) symbols" mode of said state machine.

15. (Currently Amended) The method of claim 14, wherein said step (D2) of performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "5B" further includes the step of:

(D2,1) performing a frequency sweep if a frequency offset of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal is greater than the acquisition bandwidth of said carrier recovery loop so that said signal frequency falls within said acquisition bandwidth of said carrier ~~recovery~~ loop.

16. (Currently Amended) The method of claim 1, wherein said step (D) of performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(D3) causing said state machine to enter state "6", wherein in said state "6" a carrier loop process without a frequency sweep is performed.

17. (Currently Amended) The method of claim 16, wherein said step (D3) of

performing said carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "6" further includes the step of:

(D3,1) re-adjusting ~~said~~ a set of frequency coefficients and ~~said~~ a set of phase coefficients of said carrier loop to optimize said carrier acquisition of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal.

18. (Currently Amended) The method of claim 1, wherein said step (E) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes the step of:

(E1) causing said state machine to enter state "7", wherein in said step "7" the equalizer coefficients are updated by using a decision directed (DDE) algorithm.

19. (Currently Amended) The method of claim 18, wherein said step (E1) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "7" further includes the step of:

(E1,1) using a step size coefficient in said DDE algorithm to determine the error feedback from said carrier loop to said equalizer.

20. (Currently Amended) The method of claim 1, wherein said step (E) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ further includes the step of:

(E2) causing said state machine to enter state "8", wherein in said state "8"

the Equalizer coefficients are updated by using a decision directed (DDE) algorithm adjusted to minimize an error feedback.

21. (Currently Amended) The method of claim 20, wherein said step (E2) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "8" further includes the step of:

(E2,1) re-adjusting said step size coefficient in said DDE algorithm to optimize said error feedback from said carrier loop to said equalizer.

22. (Currently Amended) The method of claim 1, wherein said step (E) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ further includes the step of:

(E3) causing said state machine to enter state "9", wherein said state "9" is a final state for said state machine.

23. (Currently Amended)The method of claim 22, wherein said step (E3) of performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "9" further includes the step of:

(E3, 1) tracking said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal by re-adjusting ~~said~~ a step size coefficient in said DDE algorithm.

24. (Currently Amended) The method of claim 1 further comprising the step of:

(F) cycling said state machine back to state "0", wherein said state "0" is a

reset state of said state machine.

25. (Currently Amended) The method of claim, wherein said step (F) of cycling said state machine back to said state "0" further comprises the step of:

(F1) re-acquiring a lost Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal while said state machine stays in said state "0", wherein said state machine is reset.

26. (Withdrawn) A method of selecting a "minimum number of QAM symbols" mode of operation of QAM modem comprising the steps of:

using a host interface to select a pair of sates" 1A"; and "5A"; and

causing said state machine to progress from said initial state "1A" to a final state "9" via said state "5A" in order to automatically acquire an incoming QAM signal;

wherein said state machine utilizes a minimum number of symbols of said incoming QAM signal to complete an acquisition of said incoming QAM signal.

27. (Withdrawn) A method of selecting a "coarse frequency" mode of operation of a QAM modem comprising the steps of:

using a host interface to select a pair of sates" 1B"; and "5A"; and

causing said state machine to progress from said initial state "1B" to a final state "9" via said state "5A" in order to automatically acquire an incoming QAM signal;

wherein a step of coarse frequency estimation of said QAM signal performed in said state "1B" compensates a frequency loop for a long term frequency drift caused by a parameter selected from the group consisting of: {aging, temperature changes, and humidity changes}.

28. (Withdrawn) A method of selecting a "QAM signal frequency sweep" mode of operation of a QAM modem comprising the steps of:

using a host interface to select a pair of states "1A"; and "5B"; and

causing said state machine to progress from said initial state "1A" to a final state "9" via said state "5B" in order to automatically acquire an incoming QAM signal;

wherein a step of frequency sweep performed in said state "5B"causes a signal frequency of said incoming QAM signal to fall within an acquisition bandwidth of a carrier recovery loop.

29. (Withdrawn) A method of selecting a "maximum number of QAM symbols" mode of operation of QAM modem comprising the steps of:

using a host interface to select a pair of sates" 1B"; and "5B"; and

causing said state machine to progress from said initial state "1B" to a final state "9" via said state "5B" in order to automatically acquire an incoming QAM signal;

wherein a step of coarse frequency estimation of said QAM signal performed in said state "1B" compensates a frequency loop for a long term frequency drift caused by a parameter selected from the group consisting of: {aging, temperature changes, and humidity changes};

and wherein a step of frequency sweep performed in said state "5B"causes a signal frequency of said incoming QAM signal to fall within an acquisition bandwidth of a carrier recovery loop;

and wherein said state machine utilizes a maximum number of symbols of said incoming QAM signal to complete an acquisition of said QAM signal.

30. (Currently Amended) An apparatus for automated acquisition of a Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal, said apparatus employing a state machine progressing from an initial state to a final state; said apparatus comprising:

(A) a means for performing an automatic gain control (AGC) operation on ~~said~~ an incoming Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal to maintain a steady amplitude of said Quadrature Amplitude Modulation (QAM ) ~~QAM~~ signal;

(B) a means for performing a symbol timing recovery of ~~said~~ an input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal;

(C) a means for performing a Blind Equalization of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal without carrier lock to minimize a dispersion error of a said received Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation as compared with an error-free Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation;

(D) a means for performing a carrier recovery of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal to eliminate a residual carrier frequency error and to eliminate a phase error from ~~said~~ an acquired Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal;

(D1) a mean for performing a frequency sweep to increase an acquisition bandwidth of a carrier recovery loop; wherein said frequency sweep is used if a frequency offset of said acquired Quadrature Amplitude Modulation (QAM) signal is greater than said acquisition bandwidth of said carrier recovery loop;

and

(E) a means for performing a decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal.

31. (Currently Amended) The apparatus of claim 30, wherein said means (B) for

performing said symbol timing recovery of said input Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes:

a means for adjusting a sampling clock of said symbol timing recovery loop.

32. (Currently Amended) The apparatus of claim 30, wherein said means for performing said Blind Equalization of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal without carrier lock further includes:

a means for minimizing a dispersion error of ~~said~~ a received Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation as compared with an error-free Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation.

33. (Currently Amended) The apparatus of claim 32, wherein said means for minimizing said dispersion error of said received Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation as compared with said error-free Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal constellation further includes:

a means for adjusting a set of coefficients of an equalizer.

34. (Currently Amended) The apparatus of claim 30, wherein said means (E) for performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes:

a means for updating a set of coefficients of ~~said~~ an equalizer.

35. (Currently Amended) The apparatus of claim 30, wherein said means (E) for

performing said decision directed equalization (DDE) of said Quadrature Amplitude Modulation (QAM) ~~QAM~~ signal further includes:

a DDE algorithm.

36. (Withdrawn) An internal modem controller comprising:

a modem;

and

a controller embedded in said modem; said controller is configured to control said modem according to a control algorithm.

37. (Withdrawn) The apparatus of claim 36, wherein said modem further comprises:

a QAM modem.

38. (Withdrawn) The apparatus of claim 36, wherein said modem further comprises:

a QPSK modem.

39. (Withdrawn) The apparatus of claim 36, wherein said modem further comprises:

a Phase Shift Key (PSK) modem.

40. (Withdrawn) The apparatus of claim 37, wherein said modem comprises said QAM modem, and wherein said embedded controller is configured to control said QAM modem according to said control algorithm, said control algorithm comprising the following steps:

(A) Performing an automatic gain control (AGC) operation on an incoming QAM signal to maintain a steady amplitude of said QAM signal;

(B) Performing a symbol timing recovery of said input QAM signal by

adjusting a sampling clock of said symbol timing recovery loop;

(C) Performing a Blind Equalization of said QAM signal without carrier lock to minimize a dispersion error of said received QAM signal constellation as compared with an error-free QAM signal constellation by adjusting a set of coefficients of said equalizer;

(D) Performing a carrier recovery of said QAM signal to eliminate a residual carrier frequency error and to eliminate a phase error from said acquired QAM signal;

and

(E) Performing a decision directed equalization (DDE) of said QAM signal by updating a set of coefficients of said equalizer by using a decision based algorithm.

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Respectfully Submitted,

Boris Tankhilevich

Reg. No. 38,689.

Patent Attorney for the Applicant.